Appl. No.: 10/729,560
Amdt. dated 05/10/2005
Reply to Office action of February 10, 2005

REMARKS

This Amendment is filed in response to the Office Action dated February 10, 2005. Applicants first note with appreciation the thorough examination of the application as evidenced by the Office Action. In response to the Office Action, Applicants have amended Claims 5, 11, and 19. Applicants respectfully submit that the claims as amended are patentable over the cited references and therefore request reconsideration and allowance of the claims in light of the remarks below.

I. The Claims Are Definite

On page 2, the Office Action rejects Claims 5 and 11 as indefinite. These claims were rejected for stating that an oscillator is connected to the device, but the device does not use the signal from the oscillator. In light of the Office Action's rejection, Applicants have amended these claims to recite that timing is determined independent of a local oscillator. Further, in studying the claims, Applicants noted a small typo in Claim 19, which has been hereby corrected.[1] Applicants respectfully submit that the amended Claims are now definite.

II. The Claims Are Patentable

On pages 3-6, the Office Action rejects Claims 1-11 as obvious in light of U.S. Patent No. 6,013,108 to Karolys. Specifically, the Office Action alleges that the '108 Karolys patent discloses a similar network system to the claimed invention. The Office Action alleges that the '108 Karolys patent discloses asynchronous operation using a transmitted signal, but does not disclose that the signal has bit transitions. The Office Action argues that such mode of operation would have been obvious in light of an article by Gorry Fairhurst entitled "Manchester Encoding" and/or U.S. Patent No. 4,449,119 to Hanna. Applicants respectfully disagree.

As background, the claimed invention relates to a solution for networking various sensors and actuators in the field by a common bus to a bus controller. Network device interfaces are used to connect one or more sensors and/or actuators to the bus and handle communications

[1] The amendments made to all of the claims were merely for clarification and were not made in light of the prior art.

between the bus controller and the sensors and/or actuators. The system uses a simplified protocol for transmitting commands and data between the bus controller and network device interfaces. By using a simplified protocol, less sophisticated network device interfaces are needed. The system may also use transmission signal protocol that allows for synchronization of the bus controller and the network device interface across the bus. This allows the system to use either a cheaper, less accurate oscillator, or no oscillator at all. Importantly, the ability of the network device interface device to detect bit rate is advantageous for fast recovery when there are power glitches in the networked system, or where the controller has transitioned from synchronous to asynchronous mode. A second important advantage of the automatic synchronous clock detect and automatic bit rate detect features is that it allows a single type of network device interface to communicate on the network using different modes of network communication. Designer of the network system can choose the mode of network communication that is optimized for the particular application of the network system.

The present invention includes a bit-rate detector in the network device interface that is looking for one of a finite set of bit-rates. The bit-rate detector uses multiple bit decoders, each implementing the necessary timing to successfully decode bits at a particular bit rate. Each bit-rate bit-decoder is simultaneously attempting to decode bits. If one of the valid bit-rates is sent, one bit decoder will successfully decode bits while the others will fail. This will cause a valid condition for a particular bit-rate and the command/data decoder will switch to decoding at this bit rate. In some embodiments, the present invention uses a dummy or example message. This message is used for the purpose of determining the bit rate, as its bit content is known.

The focus of the claimed invention is the concept of using the Manchester encoded signal to do a bit-wise reclocking of the network device interface's asynchronous bit decoder on each bit. As the speed of the bus is increased, it becomes necessary to find ways to align the decoder with the incoming bit pattern. Manchester coding has a transition in every bit. What may not be obvious is that this transition can be used as a reference point in an asynchronous receiver to start a counter that can find a "stable region" to decode the state of the next bit. This becomes critical as the duty-cycle of the Manchester-coded bits gets very small. This cannot be done with other

coding schemes, such as NRZ, because transitions cannot be guaranteed like with Manchester codes.

With regard to the rejections, Applicants initially note that the Fairhurst article is not prior art. The article is dated January 9, 2001. The present application claims priority to U.S. Application No. 09/735,146, filed December 12, 2000, which is prior to the publication date of the Fairhurst article.

On page 6, the Office Action states that it is clear that the network device in the '108 Karolys patent uses timing determined from evaluation of the transmitted signal in place of timing from the local oscillator. Applicants completely disagree. The '108 Karolys patent, nowhere teaches or suggest asynchronous communication. The patent specifically discloses use of a clock 206 at each TBIM for synchronizing communications with the bus controller. At no point in the disclosure, does the '108 Karolys patent disclose detect bit rate from the transmitted signal to either correct or replace the signal from the local oscillator 206. As such, with regard to the argument at page 6 of the Office Action, Applicants disagree that the '108 Karolys patent teaches or suggests determination and use of the bit rate of the signal transmitted by the bus controller.

On page 5, the Office Action argues alternatively that it would have been obvious to combine the disclosure from the '119 Hanna patent with the '108 Karolys patent to create a system that determines the bit rate from the signal transmitted by the bus controller to either correct or replace the signal from the local oscillator. Applicants again disagree. At best, the '119 Hanna patent discloses clock recovery, not determination of bit rate to correct or replace a local oscillator signal. As such, Applicants argue that the disclosure of the '119 Hanna patent does not inform the patentability of the claims.

Further, Applicants note that the inventors of the '108 Karolys patent were faced with a similar issue to that of the present invention; provide a low cost networked solution. However, the inventors of the '108 Karolys patent, which one would presume are skilled in the art, did not think to use asynchronous communication by detecting bit rate of the transmitted signal. Instead, looking at the same problem as the current inventors, the inventors of the '108 Karolys patent chose not to use asynchronous communication in general, much less use of the transmitted signal

to set bit rate. Instead, the inventors of the '108 Karolys patent chose to a more expensive and complex system that employs clocks for each TBIM without compensating them with a detected bit rate from the transmitted signal. Given that the inventors of the '108 Karolys patent are ones skilled in the art and presumably knew of the '119 Hanna patent, but did not think to use asynchronous communication, Applicants respectfully submit that the claims are not obvious. The Office Action's allegation that it would have been obvious to combine the '119 Hanna patent with the '108 Karolys patent is speculative at best. Applicants instead argue that the failure of the inventors of '108 Karolys patent to use asynchronous communication by determining bit rate from the transmitted signal is proof of the non-obviousness of the claims.

In light of the above, Applicants respectfully submit that independent Claims 1, 7, 13, and 19, as well as the claims that depend therefrom, are patentable over the cited references.

CONCLUSION

In view of the amended claims and the remarks presented above, it is respectfully submitted that all of the present claims of the application are in condition for immediate allowance. It is therefore respectfully requested that a Notice of Allowance be issued. The Examiner is encouraged to contact Applicants' undersigned attorney to resolve any remaining issues in order to expedite examination of the present application.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

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Elaine Kelly — May 10, 2005
Elaine Kelly — Date